

# WIPER ASSEMBLY FOR VEHICLE

## BACKGROUND OF THE INVENTION

### Field of the invention

The present invention relates to a vehicle wiper assembly.

### Discussion of the related art

It has always been necessary, in a vehicle wiper assembly, to have technology for absorbing impacts from the outside. As one example of this, there is the technology disclosed in Japanese Patent Laid-open No. Hei. 11-34808. This technology is for absorbing the impacts from outside acting on a base end section of a wiper arm by rupturing or dropping off of a pivoted holder section.

However, with the above described technology of the related art, only a pivoted holder section is made to drop off, and a wiper motor part for driving the wiper arm remains connected to the vehicle body. The wiper motor part is heavy and so has high rigidity, and in the event that external force from outside the vehicle is applied to the wiper motor part, it is not possible to absorb the impact. Particularly to a front wiper, as the wiper assembly thereof is housed in a bulkhead having a closed sectional form extending in a widthwise direction of the vehicle along a lower edge section of a front windshield, it is also common conventional for a wiper motor to be housed in the bulkhead. And further, for this type of structure, as a gap between the wiper motor and the bulkhead is reduced, there causing a problem that it is difficult to absorb further impact.

The purpose of the present invention is to enable sufficient absorption of the

impact even when an external force from outside the vehicle is applied to the wiper motor part where there is a small gap between the wiper motor part of a wiper assembly and the bulkhead having high rigidity. The purpose of the present invention is also to improve an impact absorbing capability of the overall wiper assembly by causing the wiper assembly itself to also completely drop off due to external force from outside the vehicle, in addition to the impact absorption of the external force to the wiper motor section.

#### SUMMARY OF THE INVENTION

In order to solve the problems described above, a first aspect of the present invention, as shown in Fig. 1, is a vehicle wiper assembly 1 provided with a swingable wiper arm 12 having a wiper blade 11 for wiping a windshield 2 attached to a tip end, and a wiper motor 13 for driving the wiper arm 12, wherein the wiper motor 13 is attached to move the wiper 1 to the inside of the vehicle under an external force to the vehicle body.

According to the first aspect of the present invention, since the wiper motor moves to the inside of the vehicle under the external force, the impact from outside can be absorbed by the wiper motor part.

A second aspect of the present invention, as shown in Fig. 2, is provided with a support member 17 for attaching the wiper motor 13, and the support member 17 is swingably attached at one end to the vehicle body and fixed at the other end, and is also provided with a weak point 17c having low rupture strength in the vicinity of a vehicle body fixing section 17a.

According to the second aspect of the present invention, since the wiper motor support member has the weak point with low rupture strength in the vicinity of the vehicle body fixing section, the weak point is ruptured if an external force is

applied to the wiper motor section. And it is possible to absorb the impact by sliding the wiper motor support member to the inside of the vehicle.

A third aspect of the present invention is to provide a support member to which the wiper motor is attached, and the support member has both ends fixed to the vehicle body, and has the weak point of the low rupture strength provided in the vicinity of a vehicle fixing section.

According to the third aspect of the present invention, since the wiper motor support member has the weak points of the low rupture strength in the vicinity of the vehicle fixing section at the both ends, it is possible to absorb the impact through rupturing of the weak point by the external force and by detaching the wiper motor support member even if both ends of the wiper motor support member are fixed to the vehicle body.

A fourth aspect of the present invention, as shown for example in Fig. 2, has weak points 14c and 15c having low rupture strength provided in the vicinity of vehicle fixing sections 14a and 15a of pivot holders 15, 15 for rotatably supporting pivot shafts 104 and 105 to attach base end sections of wiper arms 12, 12.

According to the fourth aspect of the present invention, since the pivot holders for the wiper arm shafts also have the weak points of the low rupture strength in the vicinity of the vehicle fixing sections, if the external force is applied to the pivot holder sections, the weak points of the pivot holders are ruptured, the pivot holder sections become detached, and the entire wiper assembly is detached. Accordingly, it is possible to improve the impact absorbing performance of the entire wiper assembly.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a first embodiment of a vehicle wiper assembly of the present

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invention.

Fig. 2 is a schematic front elevation view of the vehicle wiper.

Fig. 3 is a cross sectional view taken along line A – A in Fig. 2.

Fig. 4 is a cross sectional drawing showing a motor bracket of Fig. 3 after rupture.

Fig. 5 is the cross sectional view taken along line B – B in Fig. 2.

Fig. 6 is the cross sectional drawing showing a first pivot holder of Fig. 5 after the rupture.

Fig. 7 is a perspective view in the direction of arrow C in Fig. 2.

Fig. 8 is a perspective view showing a second pivot holder of Fig. 7 after the rupture.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the present invention will be described in detail in the following with reference to drawings.

In the first embodiment, a wiper assembly 1, as shown in Fig. 1, is applied to a tandem type where a pair of left and right wiper arms 12 with each wiper blade 11 swing together for wiping a windshield 2 attached at tip ends. The wiper assembly 1 causes each wiper arm 12 to swing by conveying motive power of a wiper motor 13 through a link mechanism 100.

A link mechanism 100, as shown in Fig. 2, comprises a rod 101 for conveying a motive power, a crank members 102 for converting the motive power, and a link ball joint 103 for connecting the rod 101 and the crank member 102. A first pivot shaft 104 and a second pivot shaft 105 are connected to the crank members 102, 102. The first pivot shaft 104 and the second pivot shaft 105 are rotatably attached to a first pivot holder 14 and a second pivot holder 15, respectively. The first pivot holder 14 and the second pivot holder 15 are respectively connected to both ends of

a pipe 16 bent for passing over the wiper motor 13. A motor bracket (support member) 17 is attached to an upwardly bent section of the pipe 16.

As described above, the motor bracket 17 supporting the first pivot holder 14, the second pivot holder 15 and the wiper motor 13 is integrated through the pipe 16, which means that the vehicle wiper assembly 1 has a modular structure with high rigidity.

Next, the motor bracket 17, the first pivot holder 14 and the second pivot holder 15 will be described in detail thereafter.

First of all, the wiper motor 13 is attached to a central section of the motor bracket 17 by using screws 13a, 13a, 13a. A motor bracket fixing section 17a for fixing to the vehicle body using a screw 171, a washer 172 and a rubber 173 is provided at a lower end of the motor bracket 17. An elliptical hole 17b is then formed between the wiper motor 13 and the motor bracket fixing section 17a. Both side sections of the elliptical hole 17b constitute low rupture strength weak points 17c, 17c. Another end of the motor bracket 17 constitutes a bearing section 17d for the pipe 16, and is rotatably attached to the pipe 16 by using nuts and bolts 170, 170, 170.

Also, a first fixing section 14a for fixing to the vehicle body above the first pivot holder 14 by using a screw 141, a washer 142 and a rubber 143 is provided in the first pivot holder 14. An elliptical hole 14b is then formed between the first fixing section 14a and the first pivot shaft 104. Both side sections of this elliptical hole 14b constitute low rupture strength weak points 14c, 14c. Similarly, a second fixing section 15 for fixing to the vehicle body by using a screw 151, a washer 152 and rubber 153 is provided on the second pivot holder 15, to the left side thereof. An elliptical hole 15b is formed between the second fixing section 15a and the

second pivot shaft 105. The two sides of the elliptical hole 15b constitute low rupture strength weak points 15c, 15c.

Next, an operation will be described when an external force is applied to sections including the vehicle wiper assembly 1.

First, when the external force is applied to the wiper motor 13 part, as shown in Figs. 3 and 4, due to the fact that the weak points 17c, 17c of the motor bracket 17 are ruptured, the motor bracket 17 rotates towards the inside direction of the vehicle body and is detached. Also, the wiper motor 13 is detached due to the fact that it rotates inside a narrow space formed by a vehicle body panel shown by the dotted line in the drawing.

Also, when the external force is applied to the first pivot holder 14, as shown in Figs. 5 and 6, the first pivot holder 14 is detached by moving towards the inside direction of the vehicle due to the fact that the weak points 14c, 14c of the first pivot holder 14 are ruptured. On the other hand, when the external force is similarly applied to the second pivot holder 15, as shown in Figs. 7 and 8, the second pivot holder 15 is detached by moving towards the inside direction of the vehicle due to the fact that the weak points 15c, 15c of the second pivot holder 15 are ruptured.

Accordingly, with the embodiment described above, if the external force is applied to the wiper motor 13, since the weak points 17c, 17c of the motor bracket 17 are ruptured and the motor bracket 17 is detached by rotating towards the inside direction of the vehicle, it is possible to absorb the impact at the wiper motor 13.

Due to the fact that the first pivot holder 14 and the second pivot holder 15 are also detached as well as the motor bracket 17, the vehicle wiper assembly 1 is completely detached by an external impact and it is possible to improve the overall impact absorbing performance of the vehicle wiper assembly 1.

In the embodiment described above, the weak points are formed by the elliptical holes, but the present invention is not thus limited, and it is possible to have the weak points formed as slots cut in from the sideward direction, or to have low rupture strength weak points formed by reducing the plate thickness.

It is also possible to have a structure where both ends of the motor bracket are fixed to the vehicle body, with the low rupture strength weak points provided in the vicinity of the vehicle body fixing sections, so that the motor bracket is detached by the external force.

While the presently preferred embodiments of the present invention have been shown and described, it is to be understood that these disclosures are for the purpose of illustration and that various changes and modifications may be made without departing from the scope of the invention as set forth in the appended claims.